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BPA Public Meeting

Northwest Power Pool (NWPP)

Members' Market Assessment and Coordination Committee (MC) Initiatives

BPA's Progress Update

March 16, 2015

Agenda

- Welcome and introductions
- Key topics for discussion:
  - Current state and problems we are trying to solve
  - Agency decision-making process and stakeholder engagement
  - Products and Services Analysis
  - Costs and Benefits Analysis
- Stakeholder Q&A

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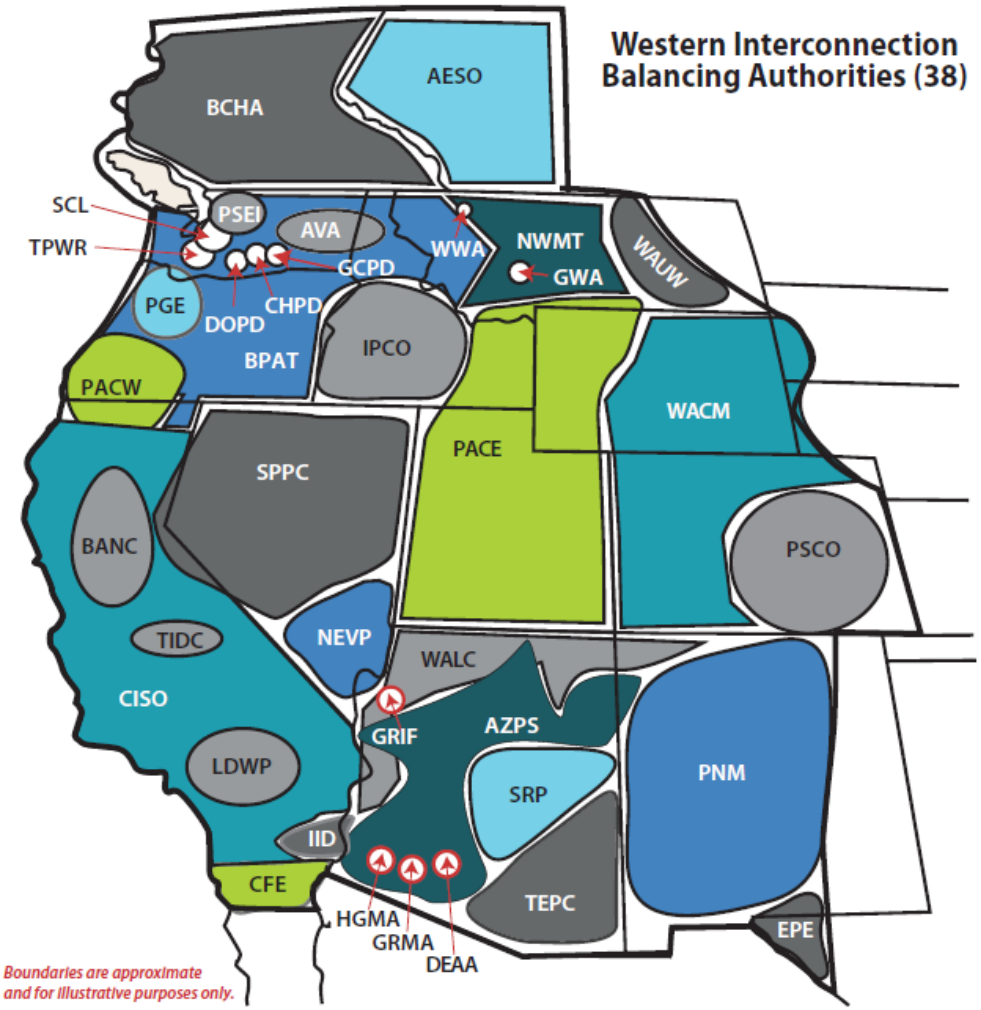
Current State and Problems We Are Trying to Solve

Current State of the Western Interconnection Balancing Areas

NW region currently operates as individual balancing areas and each BA is responsible for balancing within their own BA.



Defining the Problems We Are Trying To Solve

- Reliability is too reactionary today:
  - Need proactive operational and real-time system planning.
  - "This failure stemmed primarily from weaknesses in two broad areas—operations planning and real-time situational awareness—which, if done properly, would have allowed system operators to proactively operate the system in a secure N-1 state during normal system conditions and to restore the system to a secure N-1 state as soon as possible, but no longer than 30 minutes." - FERC/NERC Staff Report on the September 8, 2011 Southwest Blackout Event.

Defining the Problems We Are Trying To Solve

(continued)

- Uncertainty is rising, not falling:
  - Net load and generation uncertainty is rising in the West as variable energy resources come online and load patterns become less predictable.
- Systems are reaching the limits of their respective capabilities on both the Transmission and Generation systems:
  - Today there are times when BPA is operationally constrained and has to cut back on balancing capacity.
  - Flowgate congestion occurs more frequently (recession crimped load growth and without it, congestion could have been greater).

BPA Guiding Principles

- BPA continues to meet statutory and regulatory obligations.
- Clearly defined roles and responsibilities for continued reliability obligations.
- Overall benefits exceed costs, considering quantitative and qualitative factors.
- Reasonable withdrawal rights.
- Participation value is balanced against possibility of increased FERC oversight.

NWPP MC Overview

- NWPP MC's resolve to deliver reliable, cost-effective, comprehensive, regionally-developed and governed solutions to our region's power management and customer needs.

- NWPP MC is continuing to assess options for capturing the value of within-hour alternatives for its members by advancing critical due diligence, including:

  - Engaging with both the SPP and the CAISO.
  - Exploring further alternative complementary initiatives that could offer value to NWPP MC members.
  - Performing additional member-driven cost-benefit analyses.

- Implementation of reliability and efficiency enhancements already underway will also continue through 2015.

NWPP MC Overview

(continued)

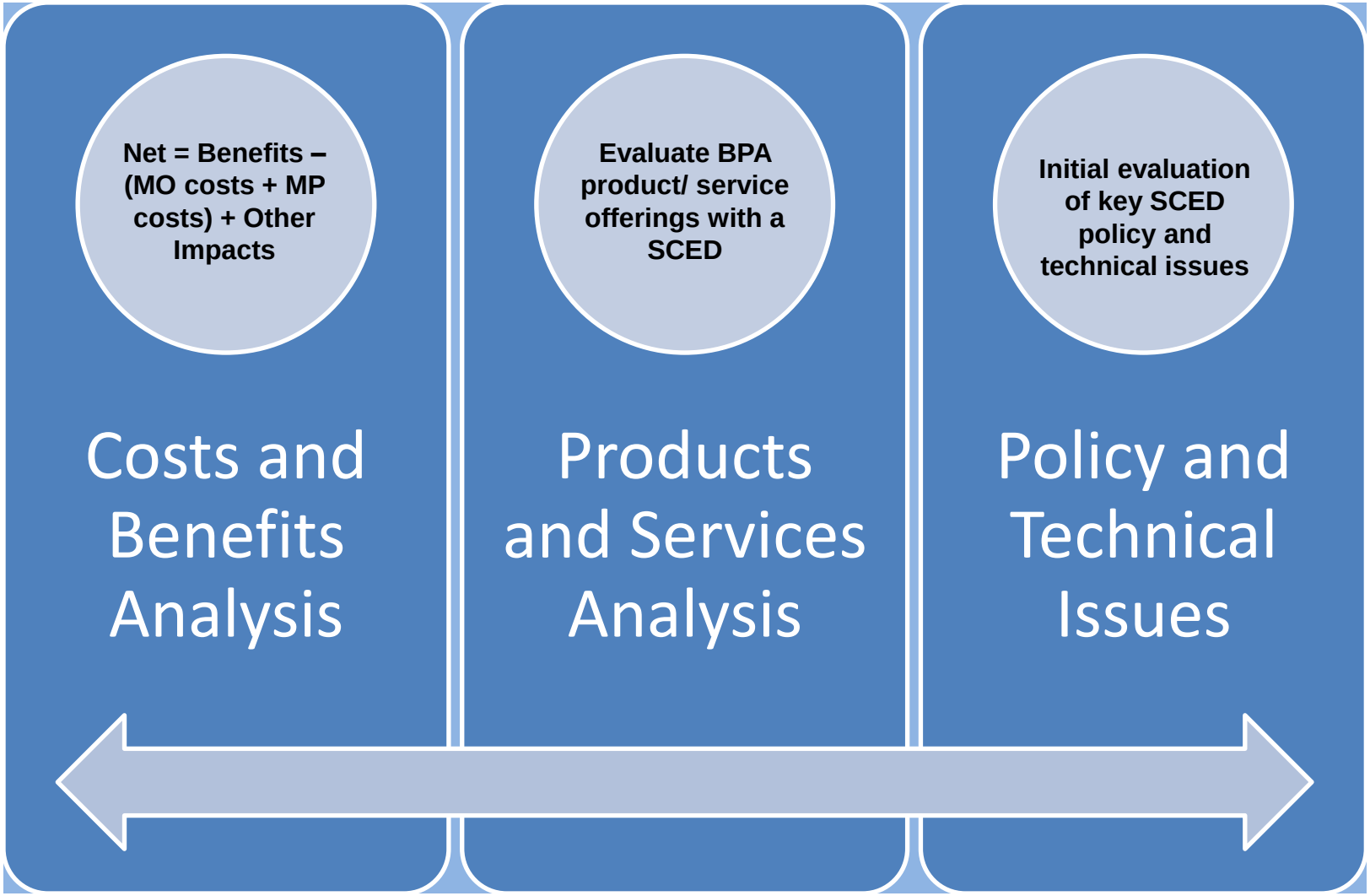
- Under a SCED, reliable and efficient generation would be drawn from across the broader Northwest market footprint and dispatched every five minutes to meet the aggregate need.

- A within-hour energy market enables:

  - Increased choices available to participants regarding how to most economically and reliably serve load and obligations.
  - Greater transparency of energy supply in the region.
  - More efficient way to resolve imbalance through footprint-wide dispatch.
  - Access to a broader range of resources.
  - Capture diversity of loads and generation that could reduce the total amount of generation held in reserve.

Agency Decision-Making Process and Stakeholder Engagement

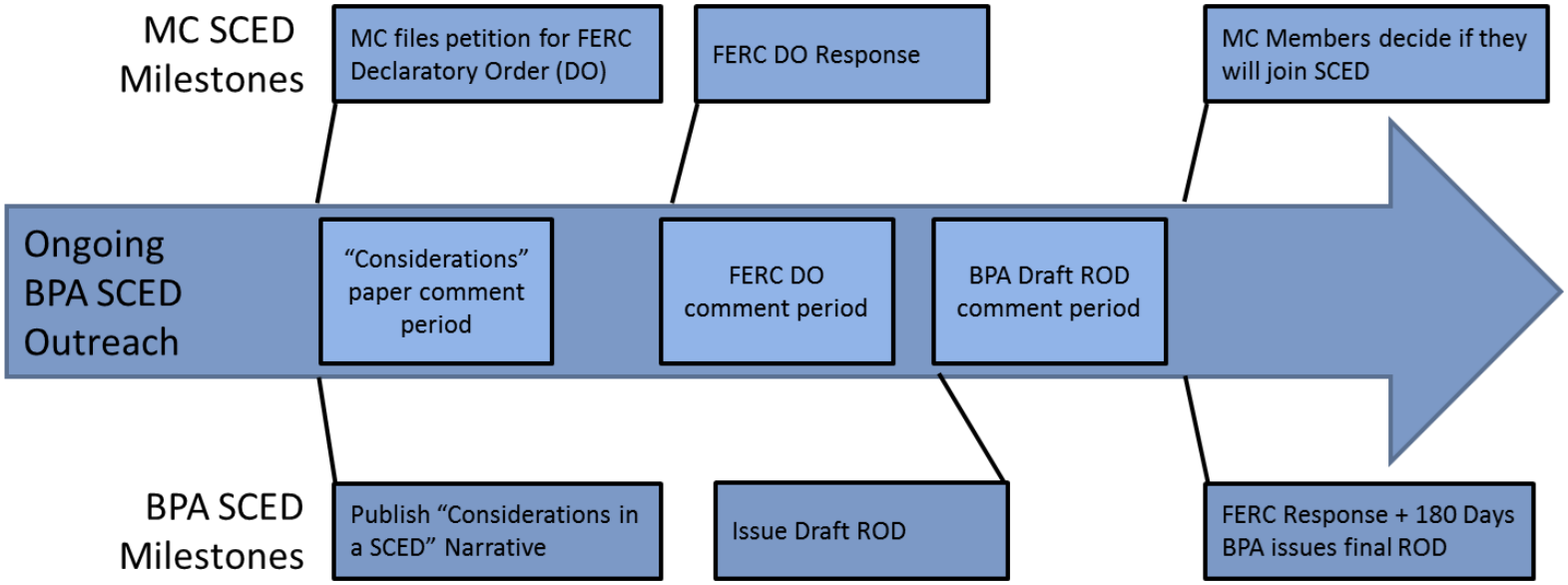
Key Elements



BPA Decision-Making Process

- **BPA will continue its dialogue with customers and stakeholders on key elements.**
- BPA formal public process would begin with publishing a "Considerations in a SCED" narrative that combines key elements.
- BPA would initiate its formal public process when each key element has been sufficiently defined, including the form of the Petition for Declaratory Order to be filed with FERC.

BPA Decision-Making Process



- Continue informal dialogue on key elements
- Launch formal process if / when FERC DO process launches
- Expect ~180 days to hear back from FERC
- BPA's goal is to publish a final decision 100 days after FERC's response

<u>Key Elements of BPA Participation in a SCED</u>
(other elements may be discovered):

- Cost and benefits analysis
- Products and services offerings
- Policy and technical issues
- Legal analysis
- FERC Declaratory Order response

Products and Services Analysis

Products and Services in a SCED

- Purpose of the paper:
  - Provide insight into the impacts a SCED may have on the products and services that BPA presently provides to its customers.
  - Attempt to identify new products and services that BPA may offer to customers in response to new, or modified, operating requirements that may result with a Pacific Northwest SCED operation.
- Disclaimer:
  - The paper represents BPA staff's preliminary thinking and will change with new information, further thinking, and customer feedback.
  - The paper is a pre-decisional document that is being used to foster discussion and align understanding.

General Observations

- **Power Products and Services:**
  - The core products and services BPA provides through its Contract High Water Mark (CHWM) and Direct Service Industrial (DSI) contracts would remain unchanged by a SCED operation.
- **Ancillary and Control Area Services:**
  - Would undergo change as a result of a SCED operation due to changes in the accounting and deployment of capacity and within-hour energy.
- **Transmission Products and Services:**
  - Some anticipated change that hinges on SCED details that have yet to be determined.

Power Products and Services

- Expectation that equity would need to be tested between Slice and non-Slice products.
- Absent other SCED detail limitations, most customers should be able to participate in the SCED with their non-Federal resources.
- Anticipated operational changes in the Diurnal Flatting Service (DFS).
- Change in the calculation of the Transmission Curtailment Management Service (TCMS) charge.
- Transfer customers not expected to be impacted differently than non-transfer customers.
- May change the identification and allocation of an Energy Imbalance costs for load following transfer customers with loads located inside the SCED footprint.
- The potential for a new product to be made available to customers that purchase the Slice/Block and Block products.
- BPA may be able to implement changes to allow nodal Federal resource scheduling without creating an impact on customer scheduling of power products.

Expectation that equity would need to be tested between Slice and non-Slice products.

- Should the within-hour energy costs and benefits observed by BPA be shared with all customers or only non-Slice customers?

- Summary of the four potential answers provided by BPA staff to this open question:

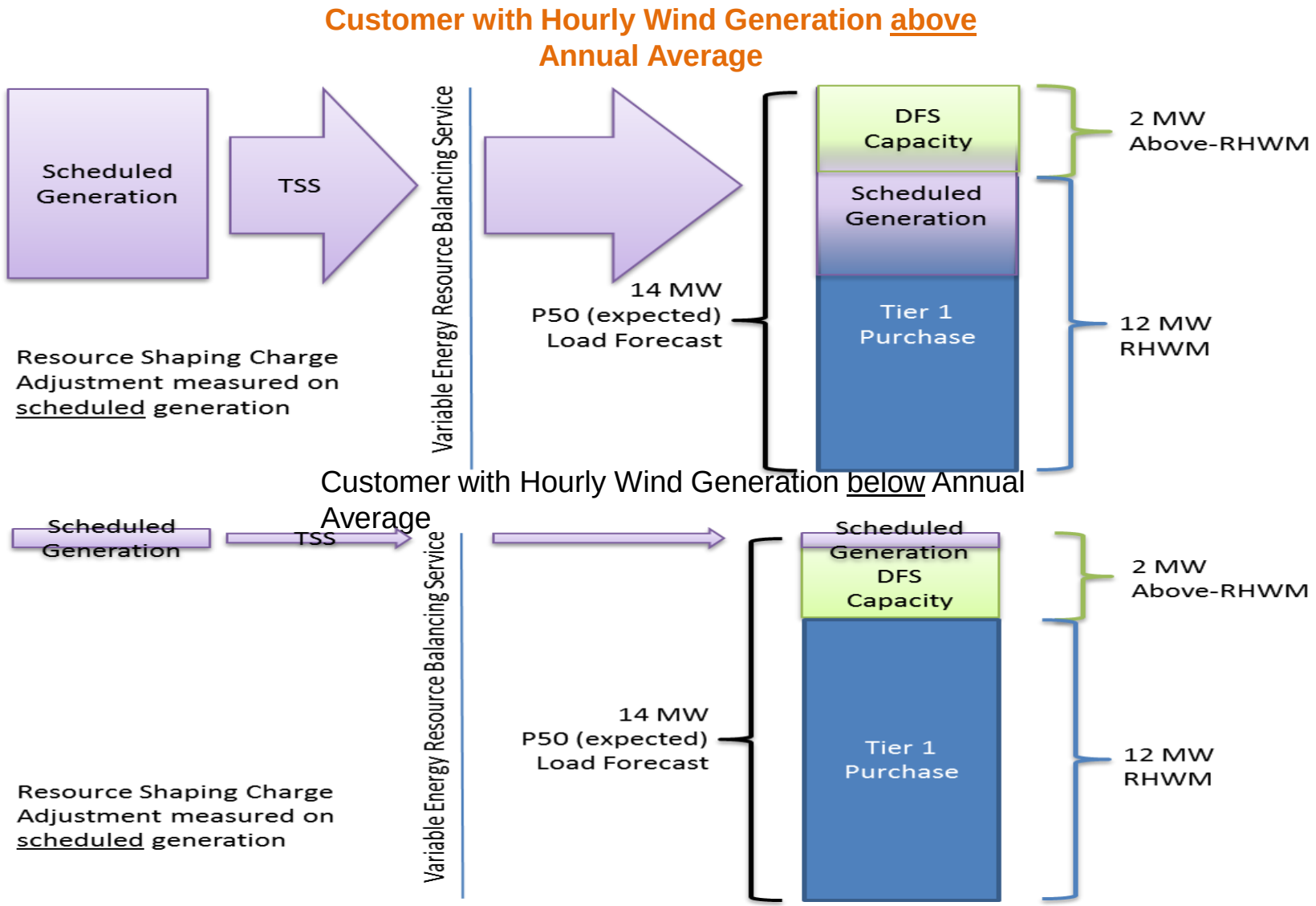
  - Answer 1: No
  - Answer 2: Not enough information
  - Answer 3: Yes, simplified approach
  - Answer 4: Yes, complex approach

Absent other SCED detail limitations, most customers should be able to participate in the SCED with their non-Federal resources.

Resource Type [a/]	Dedicated/ Designated to Load?	Scheduled or Net-Metered	Allowed to Provide Surplus to SCED?	Allowed to be Economically Displaced by SCED?
Consumer-Owned Generating	No	Scheduled	Yes	Yes
Consumer-Owned Generating	Yes	Net-Metered	No [b/]	No [b/]
Utility-Owned Generating	No	Scheduled	Yes	Yes
Utility-Owned Generating	Yes	Scheduled	Yes	Yes
Utility-Owned Generating	Yes	Net-Metered	No [b/]	No [b/]
Utility-Owned Contract	No	Scheduled	N/A	N/A
Utility-Owned Contract	Yes	Scheduled	N/A	N/A

[a/] Only resources located within the SCED footprint can participate in a SCED operation.
[b/] Slice/Block and Block customers' net-metered resources may be able to participate in a SCED operation.

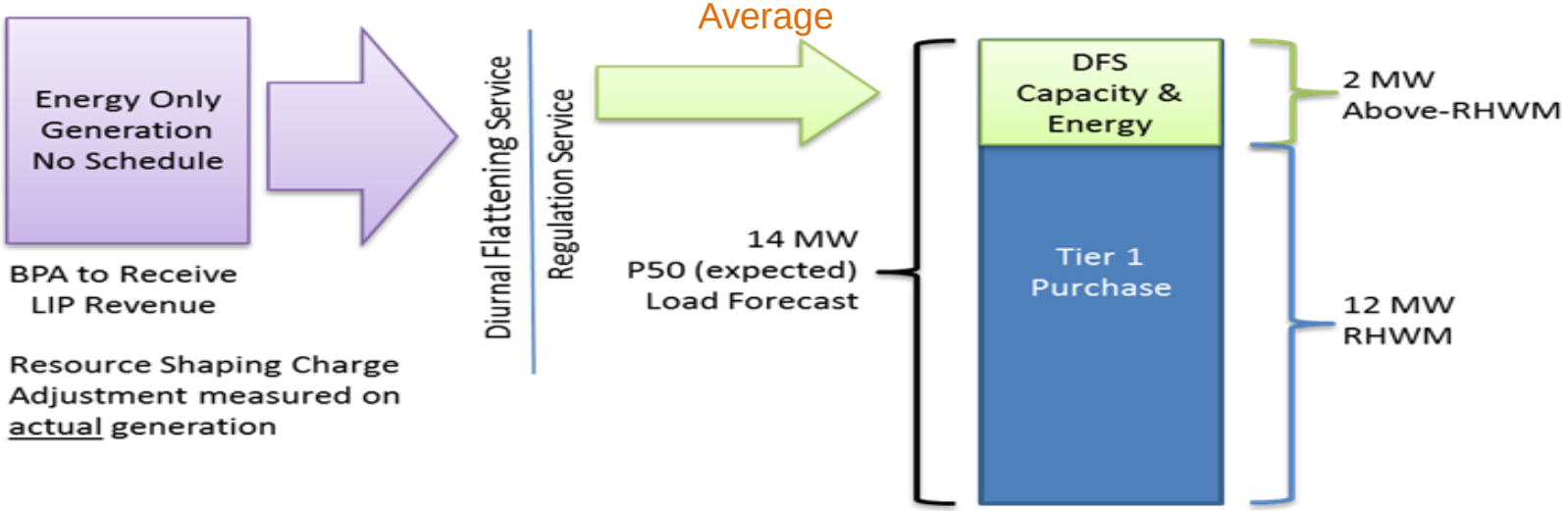
Anticipated operational changes in the Diurnal Flatting Service (DFS). Today: A financial flattening service.



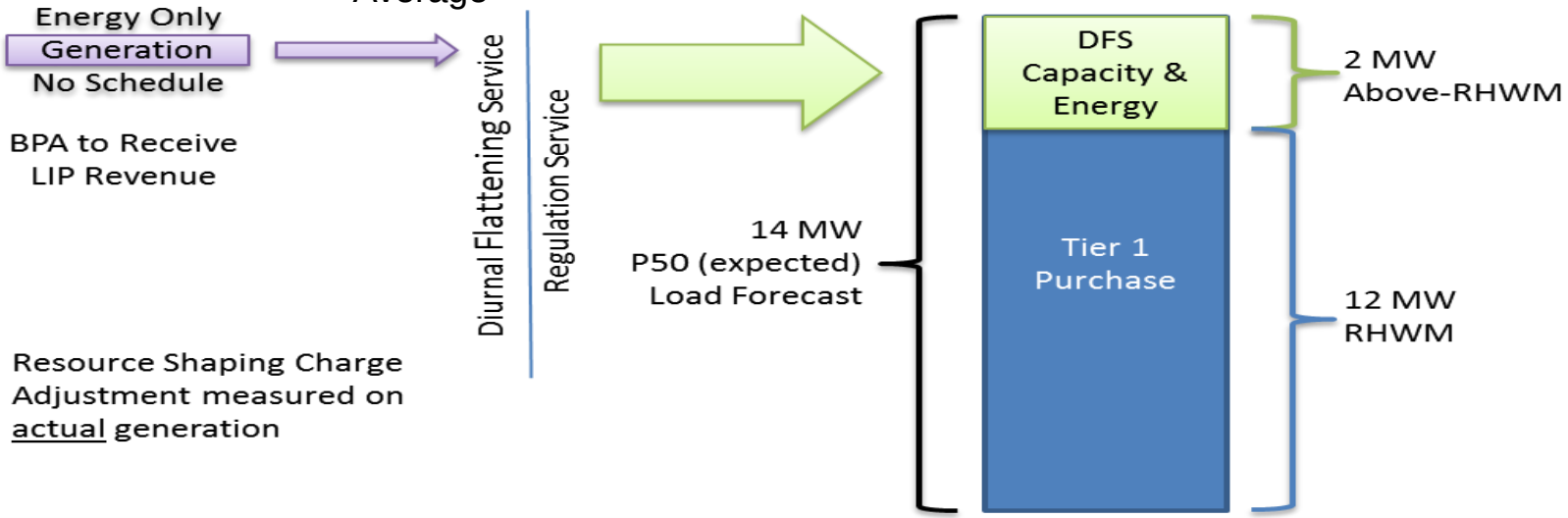
Anticipated operational changes in the Diurnal Flatting Service (DFS).

SCED: A financial and operational flattening service. (All else equal, equal to a financial saving of $4 to 6/MWh on generation.)

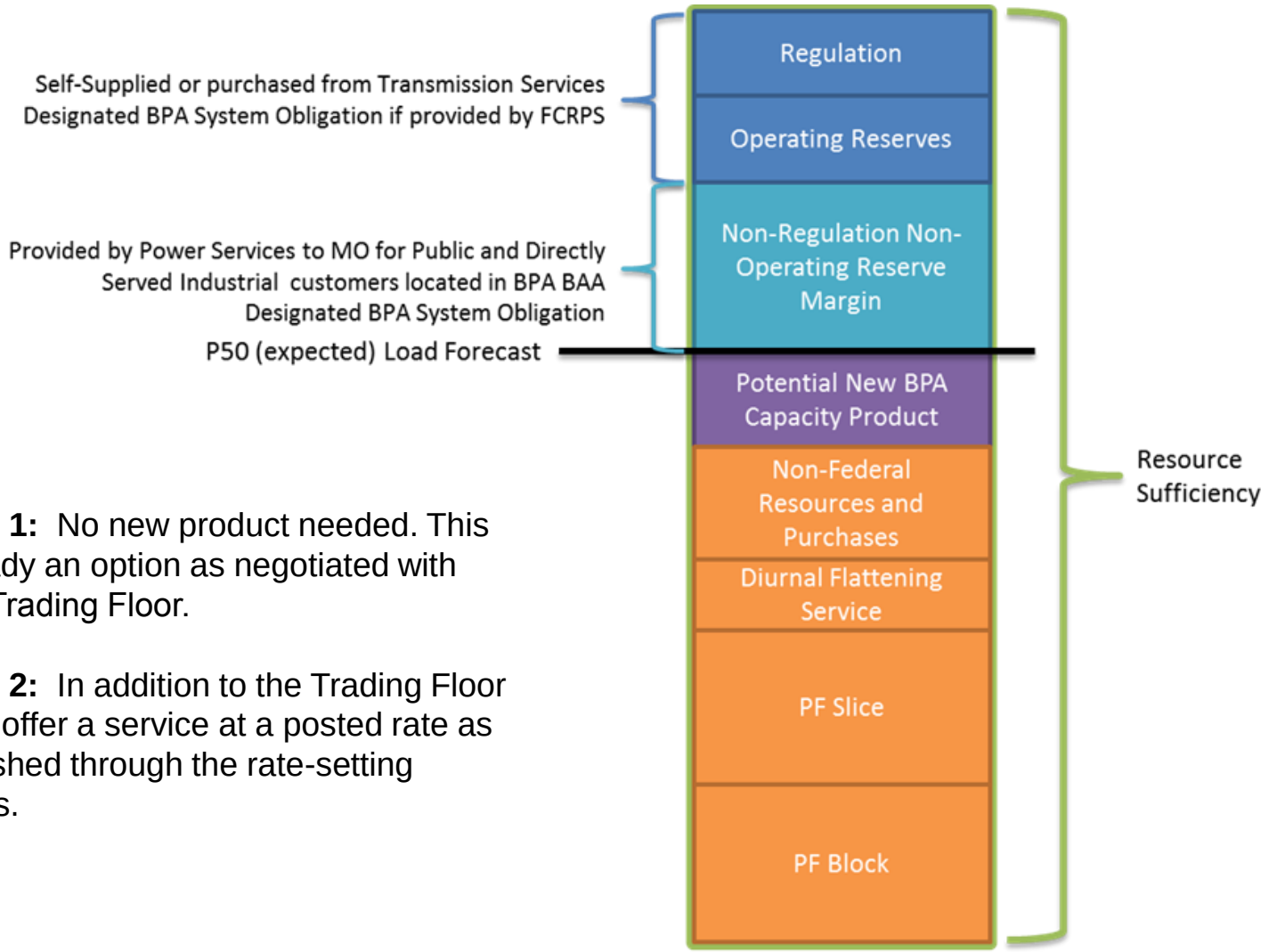
Customer with Hourly Wind Generation above Annual Average



Customer with Hourly Wind Generation below Annual Average



The potential for a new product made available to customers that purchase the Slice/Block and Block products.
Resource Sufficiency Capacity for Load

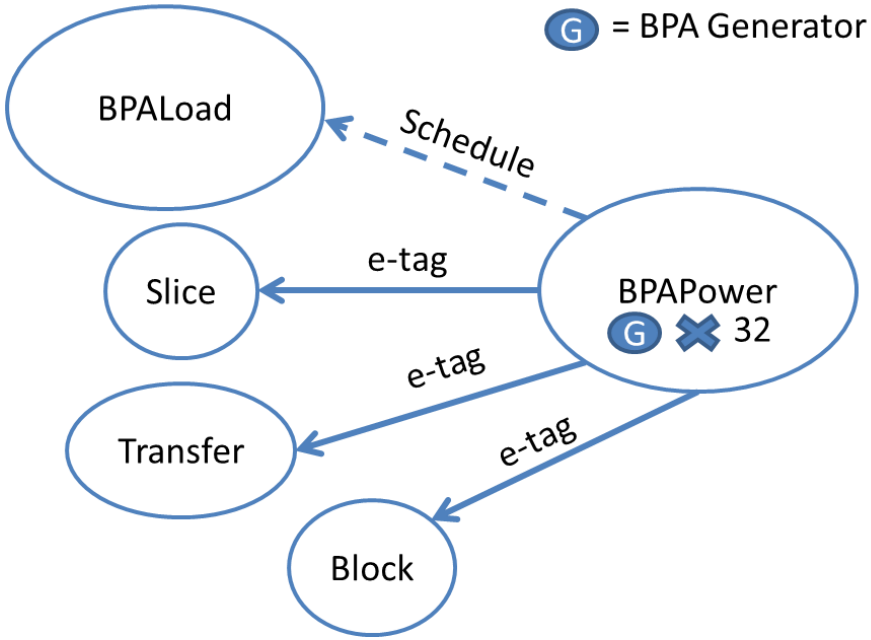


Option 1: No new product needed. This is already an option as negotiated with BPA's Trading Floor.

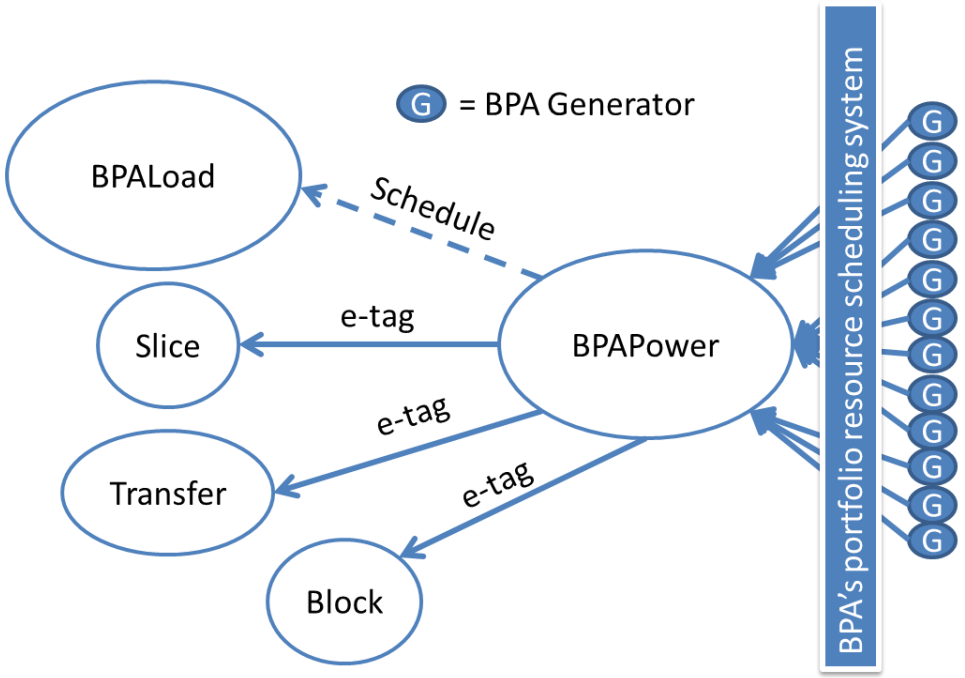
Option 2: In addition to the Trading Floor option, offer a service at a posted rate as established through the rate-setting process.

BPA may be able to implement changes to allow nodal Federal resource scheduling without creating an impact on customer scheduling of power products.

Today's Scheduling



SCED Scheduling - Investigating if this is viable



Ancillary & Control Area Services

- The definition of Regulation Service would need to be revised to align with a SCED Operation.

- Regulation Service would be required to be purchased or self-supplied by all LSEs and GOPs in the BPA BAA and would be offered as a stand-alone service for loads and resources.

- The non-regulation non-operating within-hour capacity portion of Resource Sufficiency as it is measured for loads would be provided to the Market Operator (MO) for dispatch and not Transmission Services as it is today.

- More information and discussion is needed with regard to the non-regulation non-operating within-hour capacity portion of Resource Sufficiency as it is measured for resources.

Ancillary & Control Area Services

(continued)

- The BPA provided portion of the Customer Supplied Generation Imbalance (CSGI) is subsumed in the new Regulation Service as defined in a SCED operation. The customer portion of the CSGI is subsumed in the non-regulation non-operating portion of the Resource Sufficiency Metric.

- The rate applicable to Energy Imbalance (EI) and Generation Imbalance (GI) would change from the Mid-C Powerdex hourly index to the applicable Locational Imbalance Price (LIP). Most penalties currently included in BPA's EI and GI rate schedule are expected to be subsumed in the LIP.

- The advent of a SCED would not require that Load Following customers be directly exposed to the LIPs.

Ancillary & Control Area Services

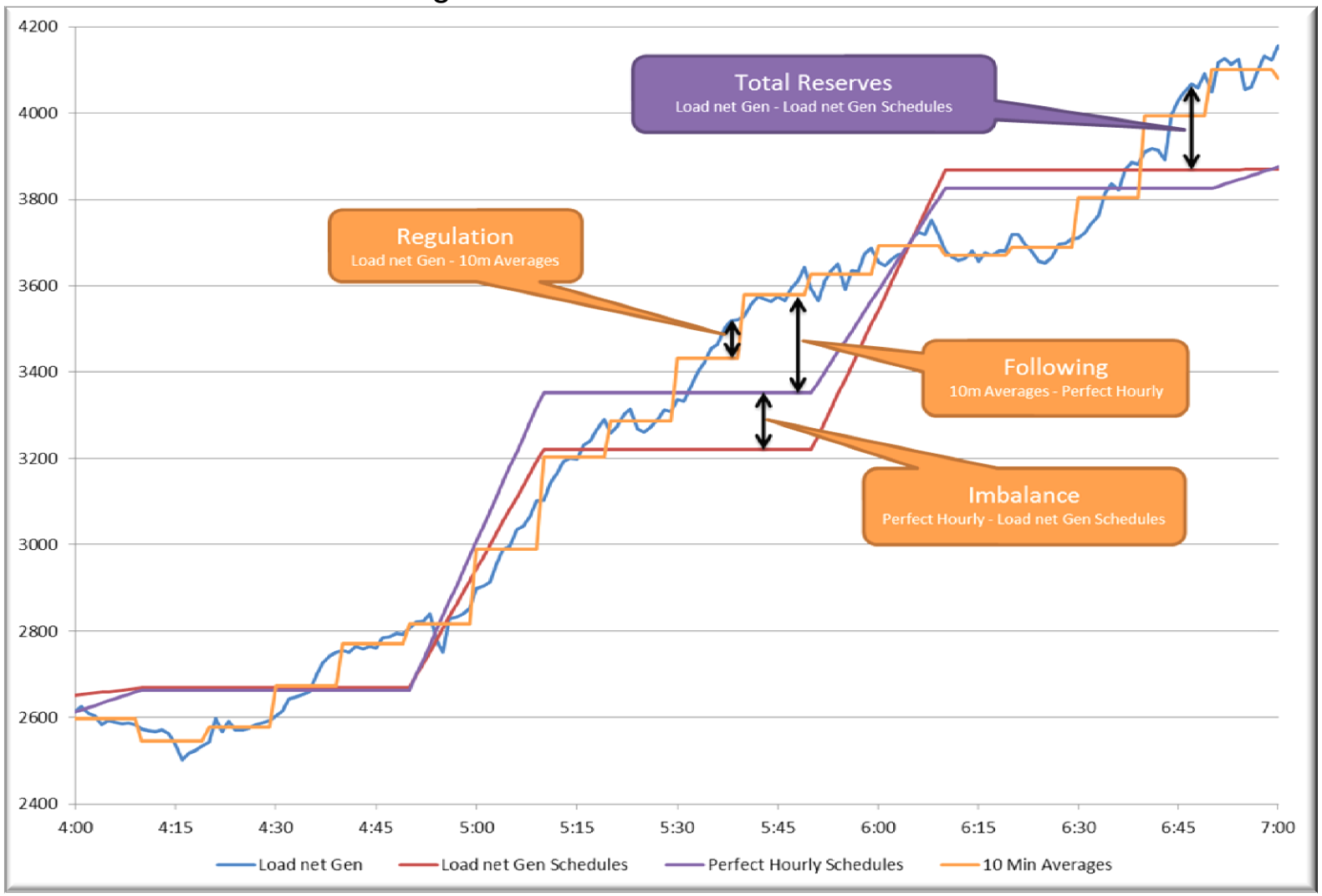
(continued)

Associated Generation Inputs

- Potential need to align Tiered Rates Methodology language with a SCED operation.
- Expected change in Power Services' accounting of actual EI and GI revenue.

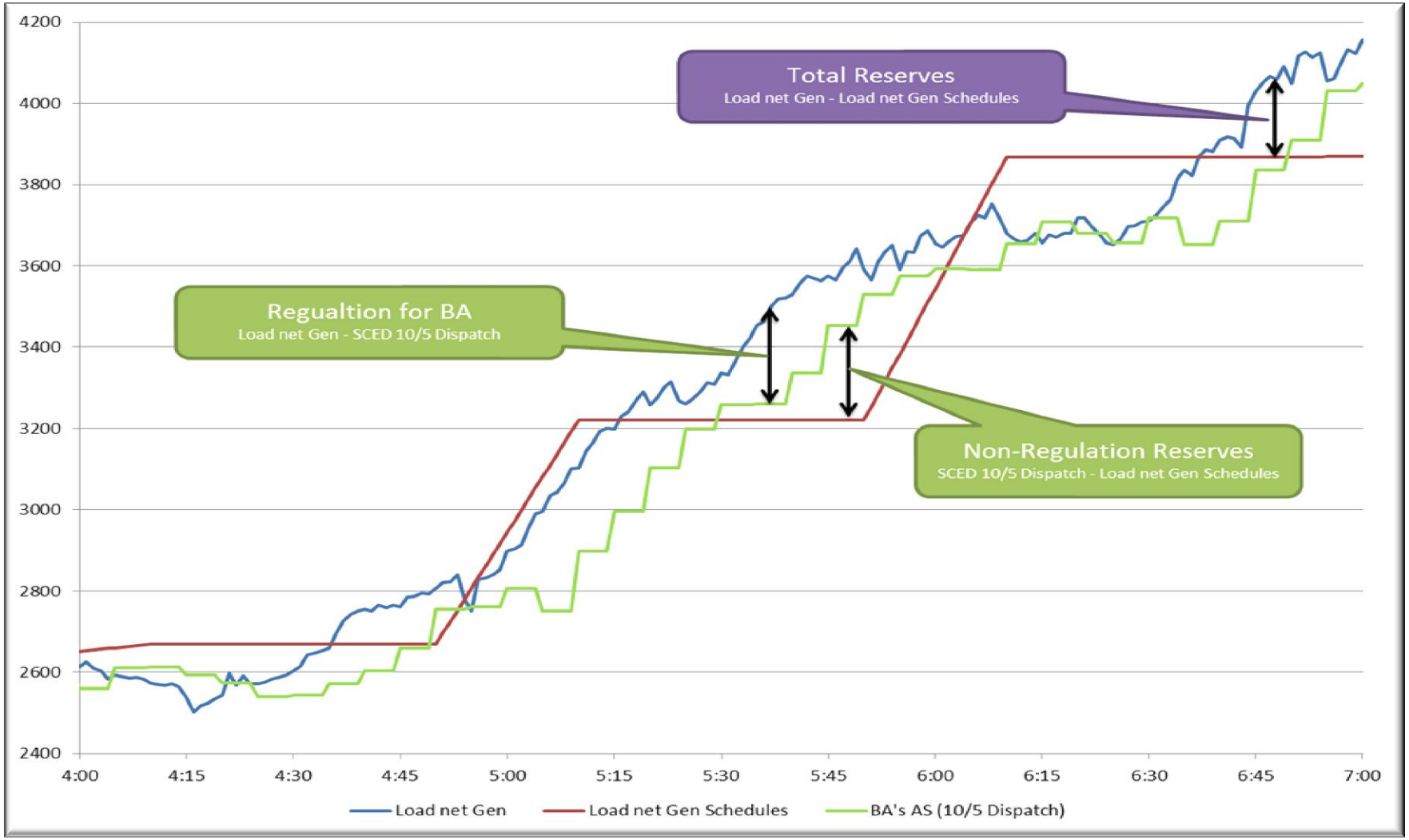
The definition of Regulation Service would need to be revised to align with a SCED Operation.

BP-16 definition of balancing reserves



The definition of Regulation Service would need to be revised to align with a SCED Operation.

Balancing Reserves SCED



Regulation Service would be required to be purchased or self-supplied by all LSEs and GOPs in the BPA BAA and would be offered as a stand-alone service for loads and resources.

- Depending on customer choice, there may not be a non-regulation non-operating capacity requirement for resources as allocated to GOPs by the BPA BAA.
- Dispatchable Energy Resources may not require a non-regulation non-operating reserve component because they are largely net metered (within-hour capacity requirement captured in Load calculation) or are dispatchable.
- Variable Energy Resources have new choices that would allow for the purchase of regulation only.
- The BPA provided portion of the Customer Supplied Generation Imbalance (CSGI) is subsumed in the new Regulation Service as defined in a SCED operation. The customer portion of the CSGI is subsumed in the non-regulation non-operating portion of the Resource Sufficiency Metric.

Potential Variable Energy Resources Alternatives under a SCED:

- **Alternative 1**:
  - Purchase only Regulation Service from BPA and generate energy without a schedule and/or schedule, hourly or sub-hourly, energy without capacity (such as non-firm or other similar product code). See DFS section above.
- **Alternative 2**:
  - Purchase only Regulation Service from BPA and actively manage, up to the close of the Resource Sufficiency Metric window, the generation of the resource based on the forecast output, the cost of short-term capacity, the expected depth of the capacity available to the MO, and other factors. These customers would operate based on short-term economics.
- **Alternative 3**:
  - Request that BPA, or some other supplier, provide a capacity service as similar as possible to the non-regulation portion of today's VERBS. More information is needed about the timelines of the Resource Sufficiency check(s) and the impact sub-hourly scheduling has on those Resource Sufficiency check(s) before an informed request can be made and a service can be designed.

Potential need to align Tiered Rates Methodology language with a SCED operation.

- The non-regulation non-operating within-hour capacity portion of Resource Sufficiency would be provided to the Market Operator (MO) for dispatch and not Transmission Services as it is today.

- This change in dispatch creates a potential need to align Tiered Rates Methodology (TRM) language with a SCED operation because not all within-hour capacity is dispatched by Transmission Services as is described in the Designated BPA System Obligations section of the TRM.

  - **Pathway 1:**
    - Continue the same mapping but revise the title of the obligation in the TRM to specifically include the non-regulation for within-hour load uncertainty that would be provided to the MO;

  - **Pathway 2:**
    - Map the non-regulation for within-hour load uncertainty obligation to the “Other reserve obligation” line item; or

  - **Pathway 3:**
    - A new Designated BPA System Obligation category.

Accounting for Within-Hour Energy.

- **Locational Imbalance Price**. The rate applicable to Energy Imbalance (EI) and Generation Imbalance (GI) would change from the Mid-C Powerdex hourly index to the applicable Locational Imbalance Price (LIP).
- **Potential Transmission Uplift Charge**. A Transmission uplift charge may be necessary to ensure BPA's cost recovery under a SCED operation:
  1. Illiquidity and Lack of Market Clearing.
  2. Market Power.
  3. Change in Use of Transmission.
- **Penalty Rate Structure**. Most penalties currently included in BPA's EI and GI rate schedule are expected to be subsumed in the LIP.
- **Rate Design for Loads**. The advent of a SCED does not require that Load Following customers be directly exposed to the LIPs. In fact, attaining equitable treatment among customer groups may require BPA continue the same treatment used today because a Load Following customer's financial exposure to the LIPs is largely dependent on the operational decisions of BPA and not the decisions of the customer.

Expected change in Power Services' accounting of actual EI and GI revenue.

- Power's share of the net revenue produced under the EI and GI rate schedules is credited to the Composite cost pool and is subject to the Slice True-up, effectively sharing the net revenue position with Slice, non-Slice and DSI customers.

- The operation of a SCED likely requires that this treatment change for two reasons.

    1. The dispatch of capacity provided to the MO may not be energy neutral.

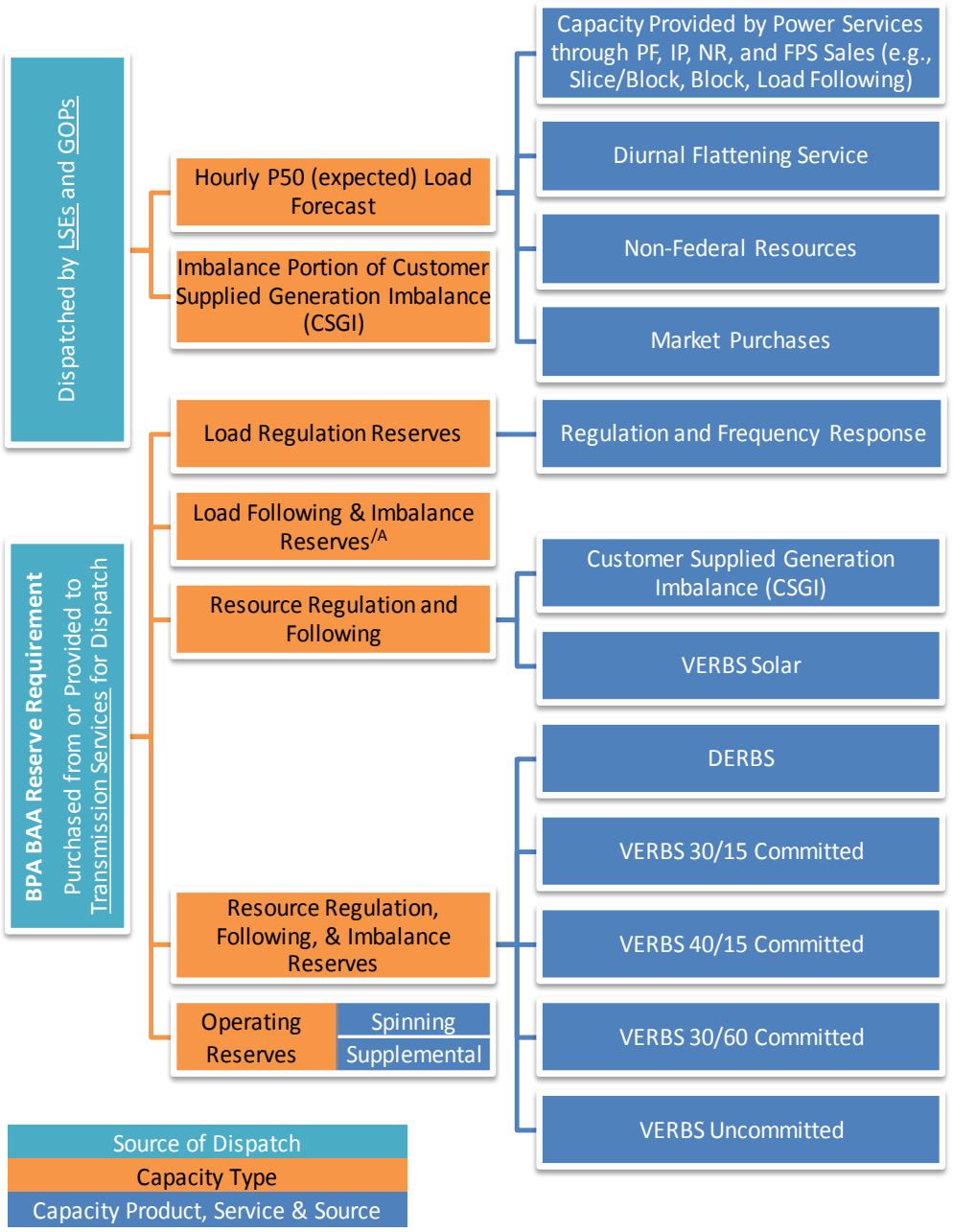
    2. The costs incurred and revenue received by Power Services would largely be a result of its operational decisions for managing non-Slice inventory.

- In a SCED, it is expected that costs incurred and revenue received by Power Services from the MO, less any sharing of within-hour benefits, would also be allocated to the Non-Slice cost pool.

Transmission Products & Services

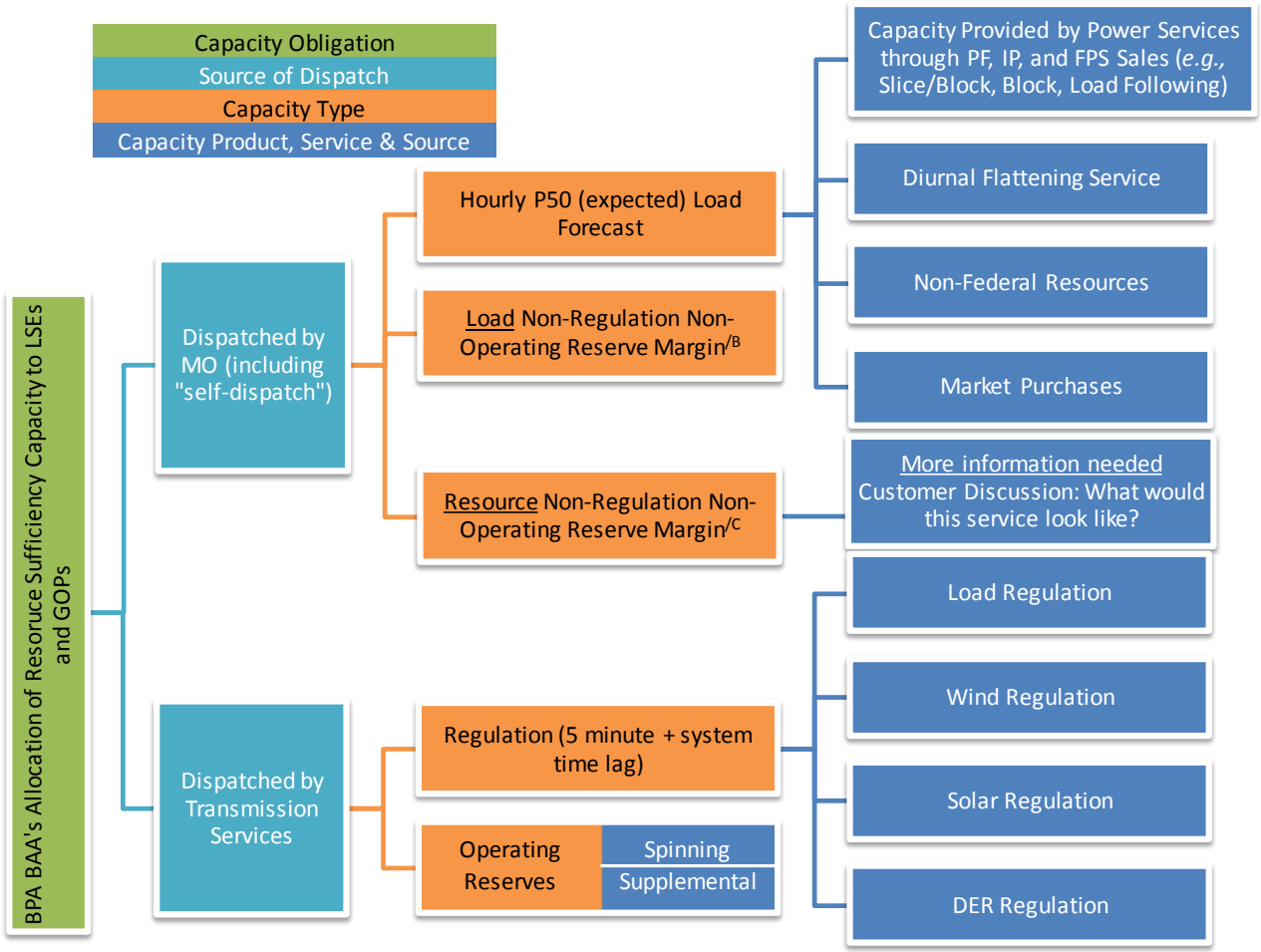
- Communication is needed between Transmission Services and the MO to correctly apply the Failure To Comply penalty.
- Possibility that the calculation and return of real power losses obligation would not be affected, which may raise hourly Resource Sufficiency issues.
- The Unauthorized Increase Charge may be impacted.
- The calculation of the Short-Distance Discount is not expected to change.
- New rate(s) would need to be proposed in the rate setting process to allow for the collection of costs associated with Resource Sufficiency Enforcement.

BP-16 Products & Services



/A Provided by Power Services for all loads in BPA BAA. Cost recovered through Power rates.

Products & Services under a SCED Operation



/B Provided by Power Services for Public and Directly Served Industrial customers in the BPA BAA purchasing firm power through the Power Rate Schedules. Cost recovered through Power rates.

/C Defined by BPA's implementation of the Resource Sufficiency Metric. Expected to be a function of resource characteristics and commercial choices (*e.g.*, energy only or Resource Sufficiency Firm).

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Costs and Benefits Analysis

Costs and Benefits Analysis Objective

- The objective of the costs and benefits analysis is to isolate net benefits for Power and Transmission of developing and participating in a NWPP MC SCED.

- Net benefits are defined as the net rate impact for Power and Transmission customers of development and participation over a 15 year horizon.

Net Benefit Calculation for BPA

BPA Net Benefit =

Benefits – (MO + MP) + Other impacts

Data Inputs:

- **Production cost:** Change in energy sales and purchases (scheduled, unscheduled, losses)
- **Flexible Reserve:** Change in capacity sales/purchases (lower reserves/salvage value)
- **Redeployment of fuel**
- **Improve congestion management** (ATC impact)

Data Inputs:

- Market Operator (MO) costs
- Market Participant (MP) costs

Qualitative Considerations:

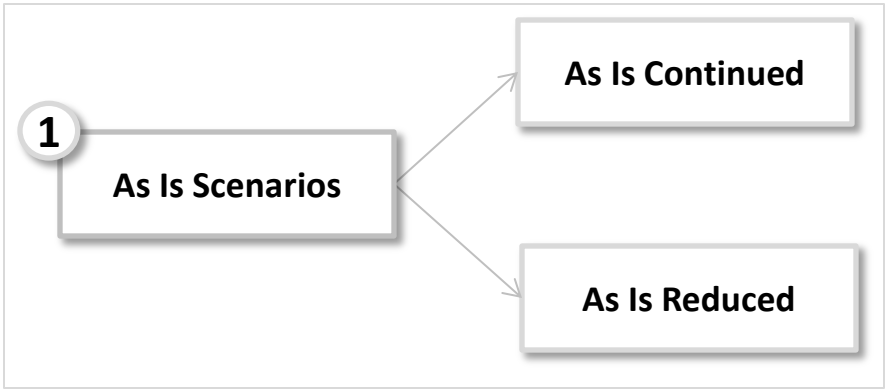
- Level integration of renewable energy
- Transparency
- Increased transmission visibility in support of more reliable outcomes
- Savings in transmission system utilization
- Change in compliance risk
- Internal assessment quantitative findings

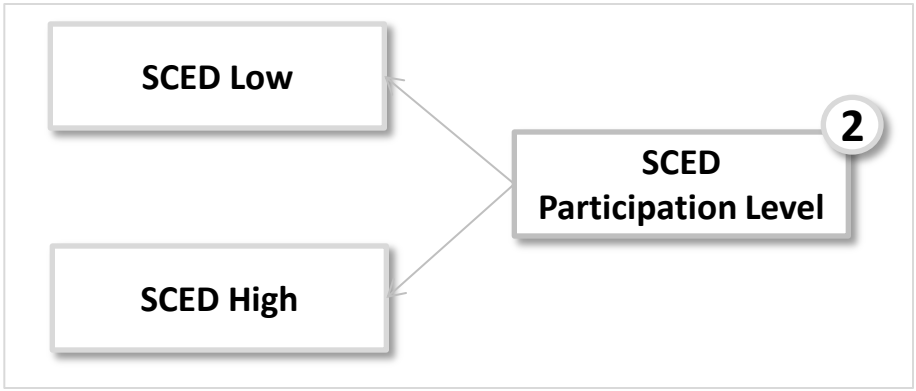
Scope Overview

- Analysis will be **rate-impact** based (Power and Transmission).
- Construction of an "As Is Case" for both Power and Transmission will be tailored to a **range of potential outcomes** for demand and supply of Power and Transmission's current product choices.
- SCED scenarios will be constructed to identify the "**book-ends**" of potential net benefits.
- **Salvage value** of released federal capacity will be monetized either through 1) higher energy value, or 2) capacity value, or 3) both energy and capacity.
- Effects of SCED on the **market price for energy** will be evaluated (qualitatively).
- **Renewable Portfolio Standards** by state will be used to evaluate **1)** future wind/renewable build-outs, **2)** Above RHWM load service projections, and **3)** RSS capacity obligations on BPA in the "As Is" Case and SCED scenarios.
- BPA's internal assessment and the MC's Market Operator **cost assumptions** will be expressed in ranges.

Foundation for the Analysis

To assess the **Power Customers impact**, the analysis uses two key sets of scenarios





The analysis results are based on the permutation of these scenarios

As Is Continued SCED Low	As Is Continued SCED High	As Is Reduced SCED Low	As Is Reduced SCED High

For these permutations, the results will show:

- Generation inputs revenue change
- Trading floor revenue impacts of released capacity
- Net benefits/costs dollar impact on Power rates
- Incremental rate impact of net benefits/costs dollar impact on Power rates

Foundation for the Analysis

The transmission analysis consists of a reliability discussion and qualitative benefits in the context of a minor rate impact.

- More reliable transmission and load service.
- Proactive and effective management of the transmission system.
- More efficient use of the transmission system.
- These are balanced against rate impact of building and operating a SCED.

Scenarios Key Assumptions

Continued "As Is"	Reduced "As Is"
• **Absent SCED implementation, an optimistic forecast of generation inputs for ancillary services revenues to power.** • **No change in bilateral market hourly liquidity.**	• Absent a SCED implementation, IOUs and IPPs leave BPA's Balancing Authority Area (BAA). • Hourly bilateral market dries up with BPA exposed to CAISO export/import fees.

SCED Low	SCED High
• **High Market Participation and Market Operator costs of SCED implementation.** • **No production cost benefits from Phase I analysis.** • **Flexible reserves reductions include assume ramping flexibility follows 5 minute calculation interval, with 10 minute persistence.** • **Low transmission loss compensation.**	• Expected Market Participation and Market Operator costs. • Low gas production cost benefits from Phase I analysis, allocated based upon federal-to-total generation in BPA BAA footprint. • Flexible reserves reductions include assume ramping flexibility follows 5 minute calculation interval, with 10 minute persistence. • Capacity sales to meet RSS requirements for Above RHWM load service and wind generation in BPA's BA to meet Resource Sufficiency requirements. • Average transmission loss compensation.

Benefits

- Within-hour dispatch/production cost savings.
- Reduction in flexible reserve requirements held for balancing reserves beyond the regulation period.
  - Alludes to changes in obligations, not diversity benefits.
- Salvage value of released federal capacity will be monetized either through:
  - Shaped energy value, or
  - Resource Sufficiency requirements and new demand for capacity products from BPA.
- Impacts of “BPA as Left Behind”:
  - Reduced demand for ancillary services as CAISO EIM captures existing demand.
  - Evolution of bilateral market/reduced hourly bilateral market liquidity.

Costs Highlights

- BPA's portion of Market Operator costs.

- Market Participant costs (both start-up and ongoing expenses):
  - Systems to quantify and value resource flexibility.
  - Documentation systems for Market Monitor.
  - Systems for resource and ancillary service plans.
  - People and O&M costs.

- Transfer customer costs in the face of nodal pricing.
  - These anticipated costs were studies and found to be de minimus.

- Loss of ancillary service revenues to Power associated with alternative product choices available under a SCED.

Market Participant Costs

- A cross-functional team of Subject Matter Experts (SMEs) was formed to develop a deterministic estimate of the anticipated Market Participant costs associated with BPA's participation in a SCED.

- This update focused on developing a range of estimated costs that is risk-informed.
  - Upside risk – mostly Power, e.g.. the offer curve development process and tool is the most costly and riskiest startup cost item.

- Stochastic modeling results in an average startup cost of $17.4 million and a 90% range of $11.3 million to $23.4 million (66% Power, 20% Transmission, 14% Corporate).

- Annual ongoing costs average $4.7 million with a 90% range of $3.6 million to $6.0 million (mostly Power).

Production Costs

- Along with the results for the Base Case, the results for these studies yielded EIM benefits that clustered within the range of $70 million to $80 million dollars per year with potential benefits ranging from approximately $125 million to as little as $17 million per year.

- BPA Power Services applies only the low gas price scenario production cost benefits highlighted in the *Analysis and Benefits of an Energy Imbalance Market in the NWPP* in this evaluation. Moreover, these production costs savings are only included in the "High" SCED scenario.

Production Costs

- Allocated to BPA based upon transaction volume, further allocated to BPA's merchant function based upon federal generation relative to total generation in BPA's BAA.

- This results in a predicted incremental addition to Trading Floor secondary revenues of $4.5 million in 2020, escalated at the rate of the annual average market price forecast from the Reference Case.

Production Costs Allocation – step 1

Allocation based upon **transaction volume****

Average Low Gas, Low Heat Rate

Balancing Authority	Transaction Volume Percentage	Share of Savings in k$
AVA	4.77%	797
BCTC	17.59%	2,938
BPA	25.77%	4,304
IPC	5.23%	873
Mid C	3.39%	565
NWMT	3.64%	608
PAC	9.85%	1,645
PGN	5.11%	853
PSE	5.03%	840
SCL	6.90%	1,152
BANC	9.25%	1,545
TIDC	1.84%	307
TPWR	1.33%	222
WAUW	0.32%	53
NWPP	100%	16,700

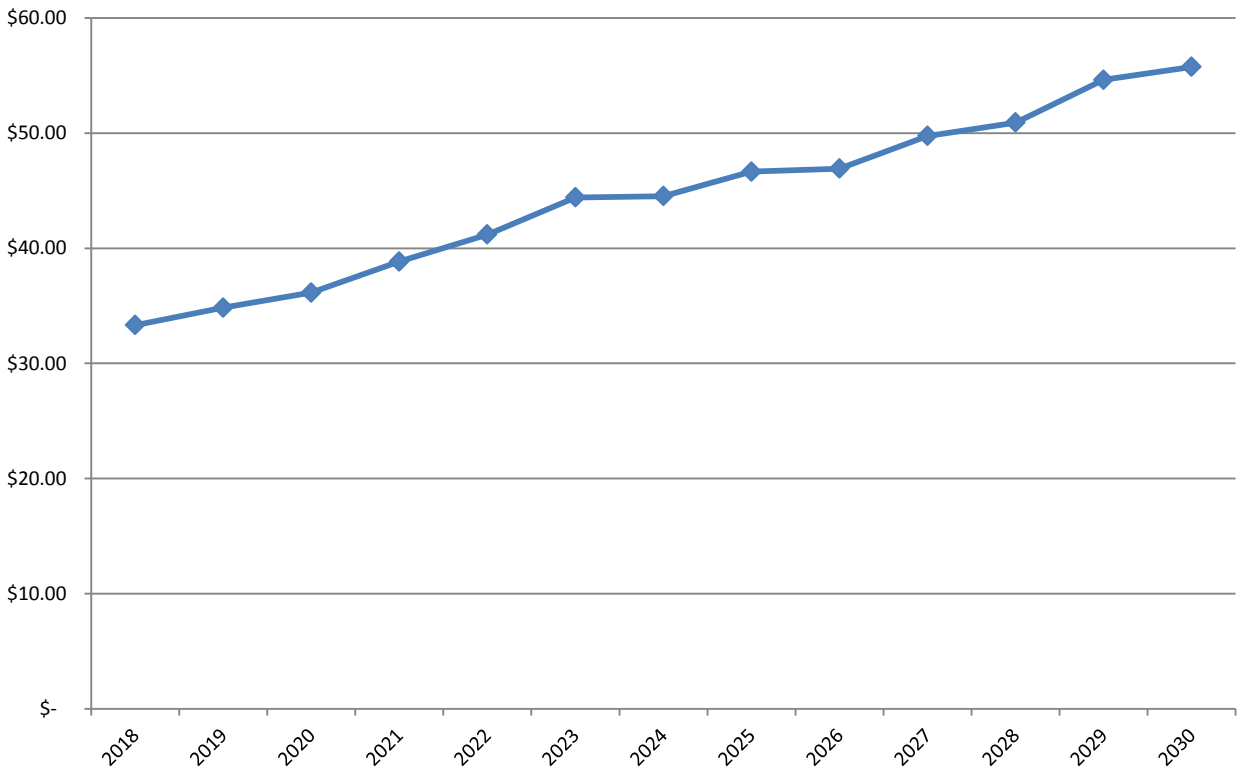
Average Low Gas, High Heat Rate

Balancing Authority	Transaction Volume Percentage	Share of Savings in k$
AVA	4.77%	1,660
BCTC	17.59%	6,121
BPA	25.77%	8,968
IPC	5.23%	1,818
Mid C	3.39%	1,178
NWMT	3.64%	1,267
PAC	9.85%	3,428
PGN	5.11%	1,778
PSE	5.03%	1,750
SCL	6.90%	2,401
BANC	9.25%	3,219
TIDC	1.84%	640
TPWR	1.33%	463
WAUW	0.32%	111
NWPP	100%	34,800

Although we know this is not desirable, it is the best methodology available, and is reasonable.
Coupled with **no** production costs assumed in the SCED Low case

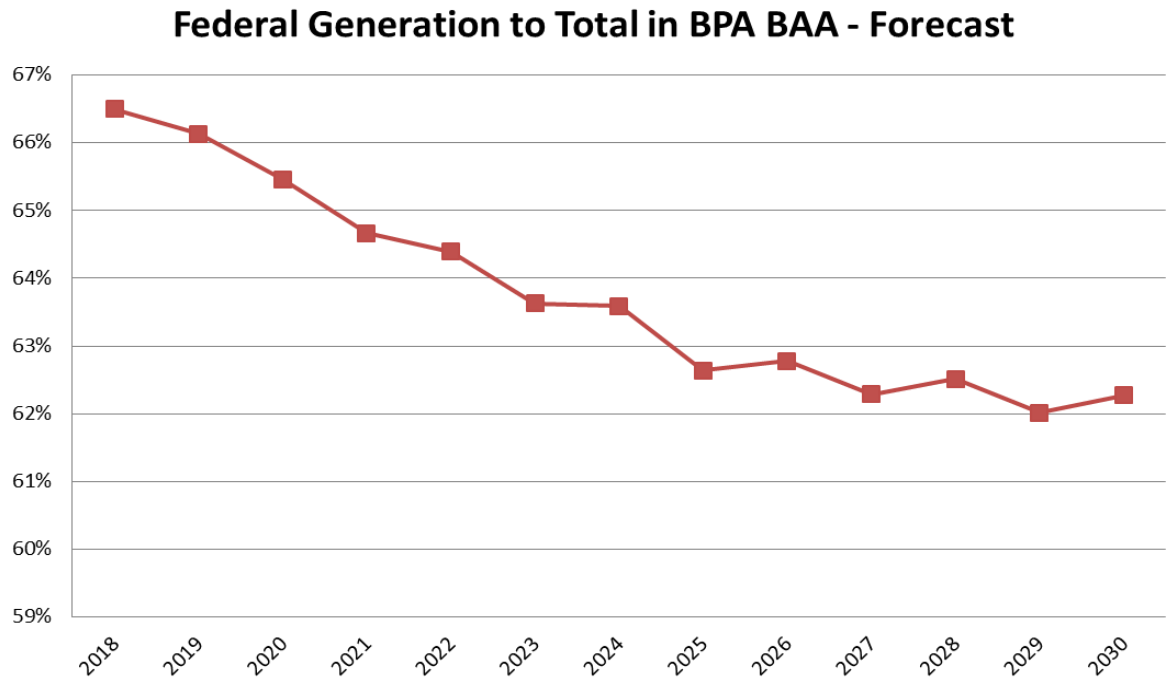
Production Costs Allocation – step 2

- Escalate at the rate of the AURORA Market Price Forecast increase from BP-16 extended through 2030



Production Costs Allocation – step 3

Allocation based upon **federal generation in BPA BAA**



Flexible Reserves

- A key potential benefit of participation in a NWPP EIM is the reduction in flexible balancing reserve requirements owing to the diversity of load and variable generation signals in larger geographic footprint.

- Signal diversity in Loads and Resources is ultimately a function of market behavior, scheduling behavior, ancillary service policies, resource characteristics, and seasonal load conditions.
  - The MC Initiative has begun work on construction of an option for interested BAs to participate in a Balancing Reserve Diversity Group (BRDG). Pending the outcome of these discussions, BPA may consider adding a forecast of diversity benefits to this analysis at a future date.

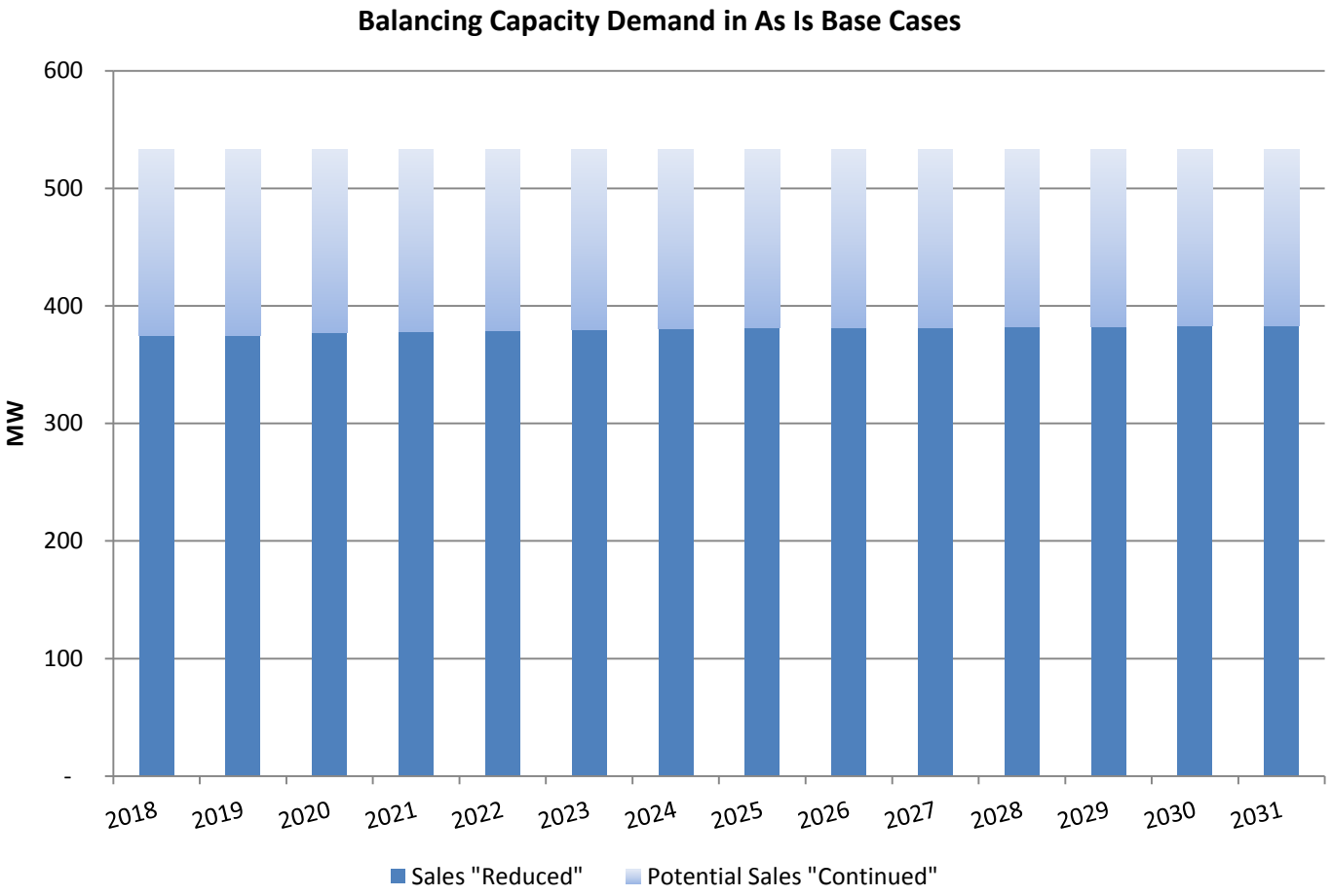
- Reduced flexible reserve requirements associated with a reduced balancing *obligation* due to the shorter time over which reserves are carrier under a SCED is included in this evaluation.
  - Depending on the time lag between Market Operator (MO) computed dispatch and actual operations, the minimum inc/dec reserves held by the BPA BA could move from 900/-1100 to as little as 400/-400 under some very optimistic assumptions.

Reserve Comparison Between FY16-17 Settlement and Three Scenarios

(Based on Close Approximations)

Products	FY 16-17 Settlement	AS-IS Continued	AS-IS Reduced	SCED
Load Regulation	85	85	85	212
Load Following	233	250	250	106
VERBs	568	687	303	177
DERBs	24	24	24	18
Total Reserves for BA and MO	910	1046	638	513
Transmission Provider Purchase	653	714	412	407

February 2015 - Assumptions



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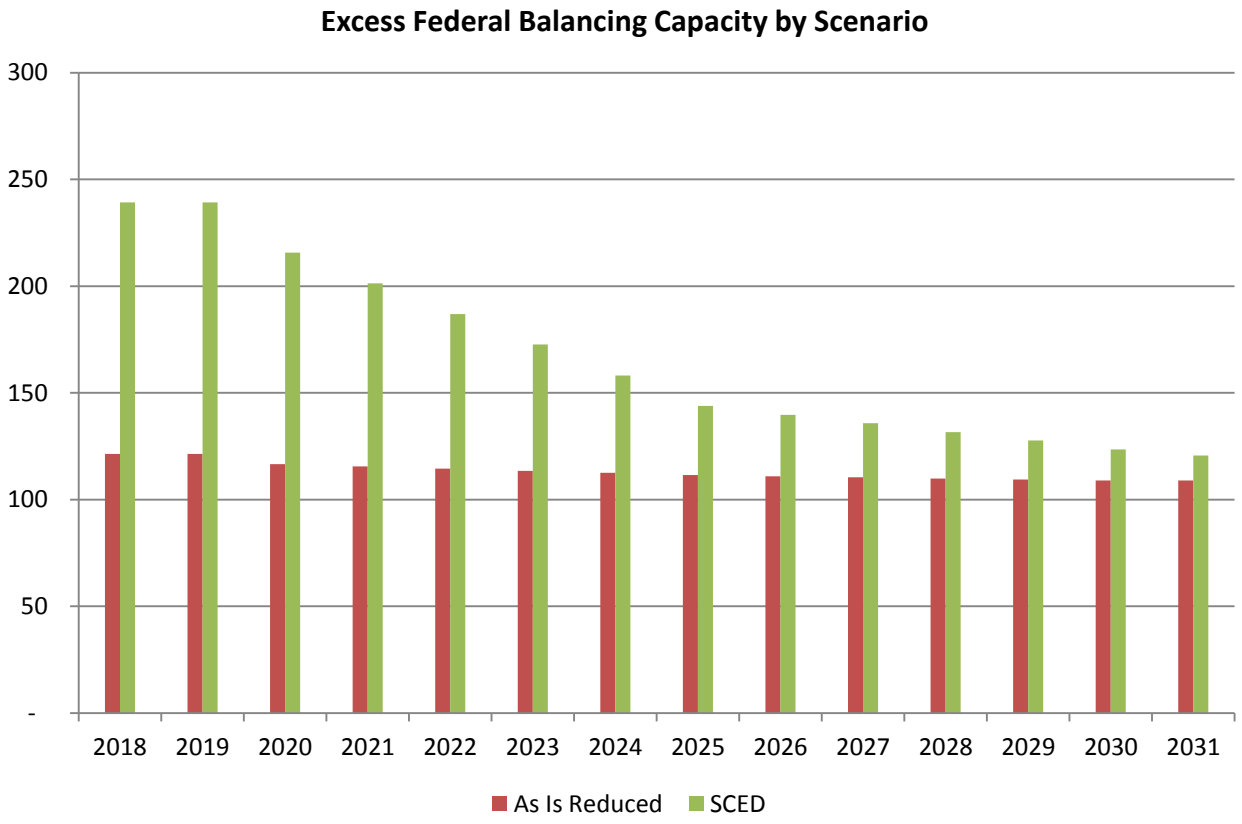

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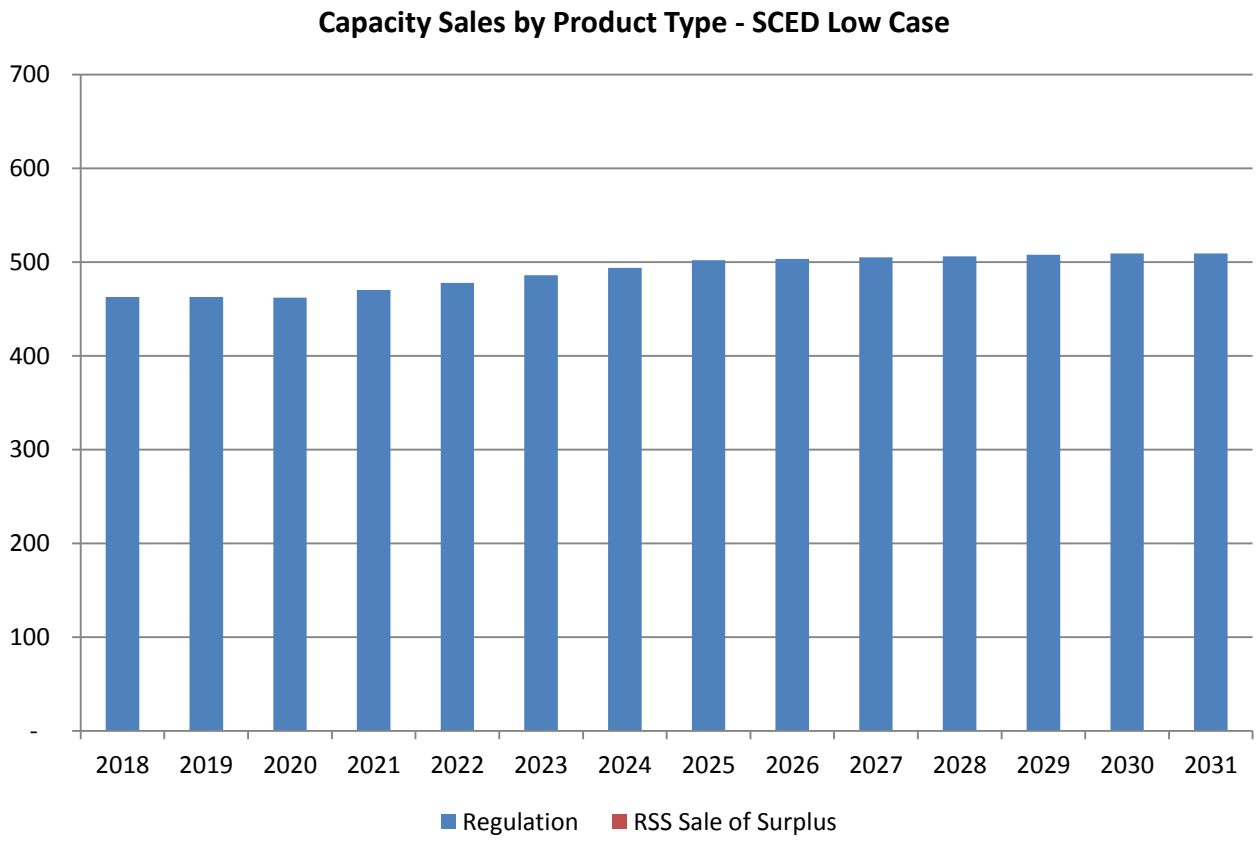

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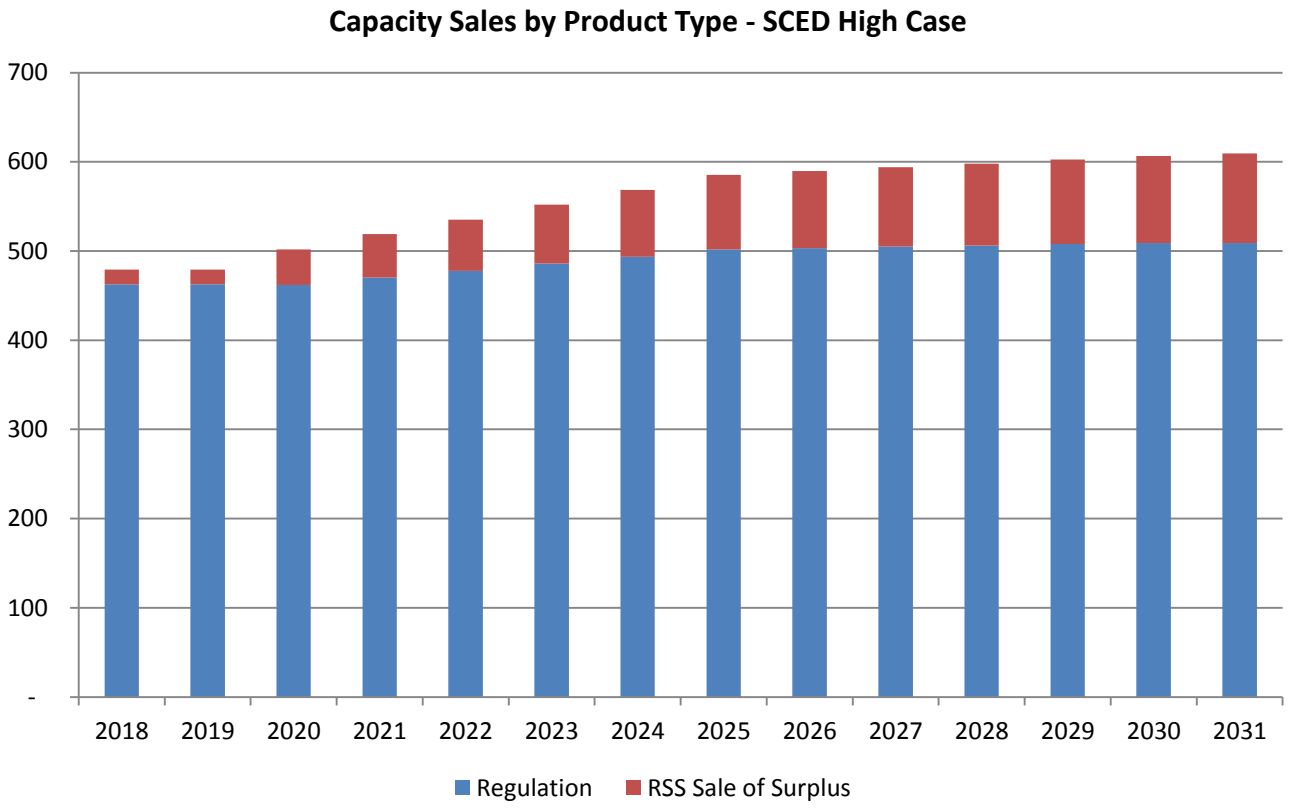


Transmission – Qualitative Benefits

- Data from SCED capabilities could potentially be used to inform ATC in the very short term timeframe (1 – X hours prior to real-time) should BPA implement limitations on ATC in that market.

  Result: Possible improvements to very near-term ATC in the short- term market.

- Improved ability to actively manage system constraints, avoid SOL excursions, and more effectively and reliably manage post-curtailment energy resupply.

  Result: Reliable Transmission and Load Service.

- Improved system visibility and near-term operational forecasting capability.

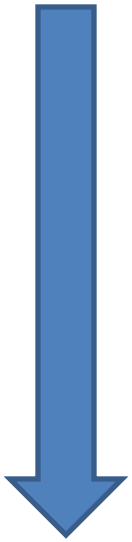
  Result: Proactive and effective management the system.

- More efficient use of transmission system capacity.

  Result: Efficient use of the Transmission System assets.

Cost Benefit Drivers – Effect on Order of Magnitude

Low



High

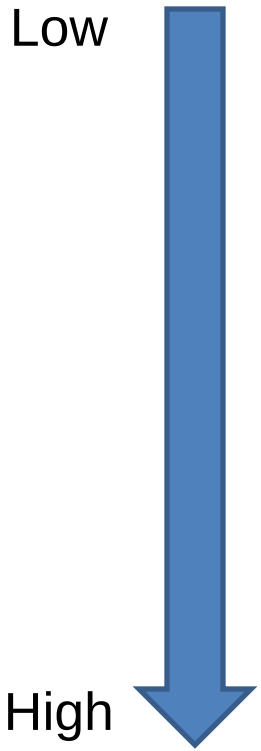
Production cost/flexible reserve salvage value

New capacity product demand – RSS

Transmission losses – benefit to Power

Change in reserve restrictions – regulation sales under SCED

Cost Benefit Risks – Effect on Order of Magnitude



Variation in market participant/operator costs

Project failure/delays, failed project management

Failed market design – no reserve sharing/diversity, RS common standard not achieved, inconsistent enforcement of market rules on resource sufficiency

Transmission compensation

MC Initiative stagnation/failure, regional fragmentation

BONNEVILLE
POWER ADMINISTRATION

Questions/Comments?

Start of open Q&A

Additional Information Sources

- BPA web page: www.bpa.gov/goto/MarketAssessment

- With links to:
  - NWPP MC: http://www.nwpp.org/our-resources/MC-Initiative
  - SPP web site (training and educational materials): http://www.spp.org/section.asp?pageID=190

BPA point of contact:

Mark Symonds

Corporate Strategy

503-230-3027

Email to submit stakeholder feedback/questions to BPA: NWPPMCfeedback@bpa.gov

BONNEVILLE
POWER ADMINISTRATION

Appendix

NWPP MC Overview

- The Northwest Power Pool (NWPP) Members' Market Assessment and Coordination Committee (MC) is a **collaboration of 19 public and investor owned utilities** from across the NWPP footprint.

- The MC is considering the design for a **within-hour energy only market**, called a security constrained economic dispatch (SCED), for a subset of NWPP balancing areas (BAs).

- BPA has been a participant of the NWPP MC initiative since the **kickoff in 2012** and has been providing significant resources and time commitment toward the MC initiative throughout.

NWPP MC Initiative Objectives

Deliver comprehensive Northwest solution to:

- Manage variable energy resource operational impacts.
- Share regional balancing diversity and capabilities.
- Enhance reliability of transmission constraint management.
- Mitigate compliance exposure and costs.
- Leverage existing tools where expedient.
- Preserve existing Reserve Sharing Group benefits.
- Respect local control and self-determination priorities.

Proposed SCED Solution

- A Security Constrained Economic Dispatch (SCED) within-hour energy only market includes the dispatch of energy to meet the collective load and obligations of the Market Footprint.
- The market is designed to resolve imbalance and lower generation costs (by displacing more expensive resources with less expensive resources based on the GOP supplied offer curves) and capture diversity.
- The design is buoyed by a Resource Sufficiency Metric that ensures entities bring enough usable capacity to meet firm obligations for each hour.

Security Constrained Economic Dispatch (SCED) Overview

What the SCED is:

- An intra-hour market for non-firm energy.
- A tool for centralized real time re-dispatch of units' *voluntarily* offered range operations.
- A market in which participation
  - is voluntary for generators offering economic redispatch flexibility (ie. offered dispatchable range).
  - is mandatory for any imbalance (loads or generation) in the footprint composed of participating BAs.

What the SCED is NOT:

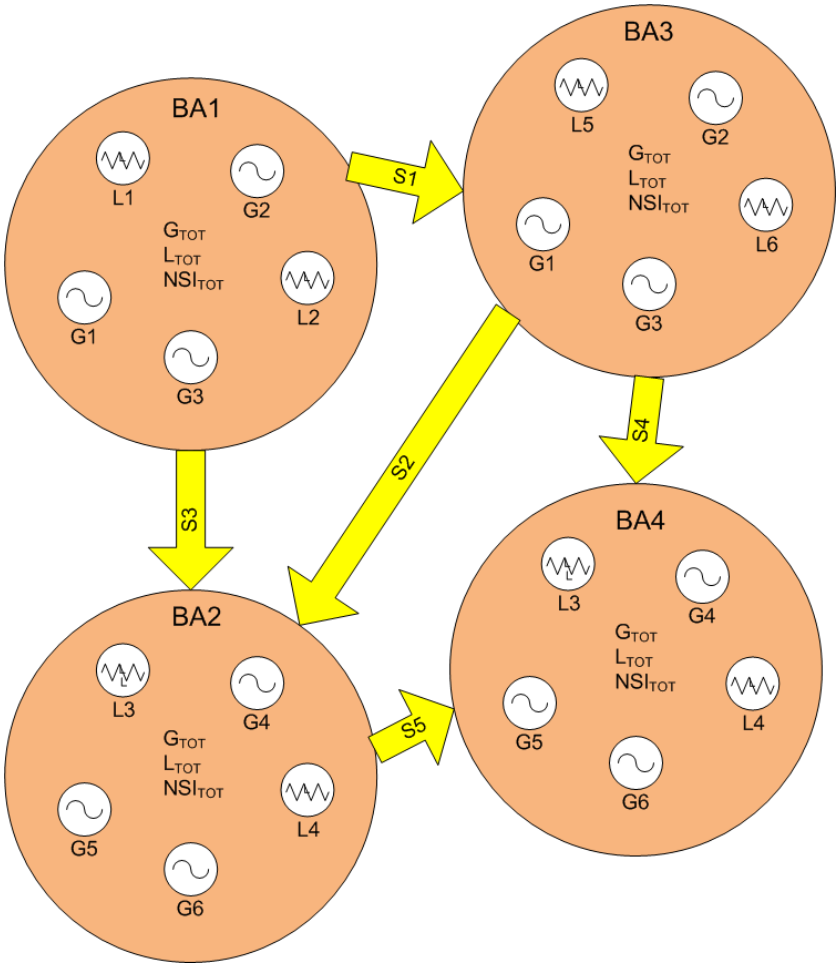
- An RTO (with planning, day-ahead markets, BA consolidation).
- A centralized unit commitment tool.
- A capacity market.
- A replacement for the current contractual business structure.

Today's World (No Regional SCED)

- Each BA takes on the obligation to balance within their own bubble.
- Outside of emergency situations, each BA must balance in their own circle and cannot use resources/load in another circle to balance.

BA = Balancing Authority
L = Load
G = Generator
NSI = Net Scheduled Interchange
S = Schedule

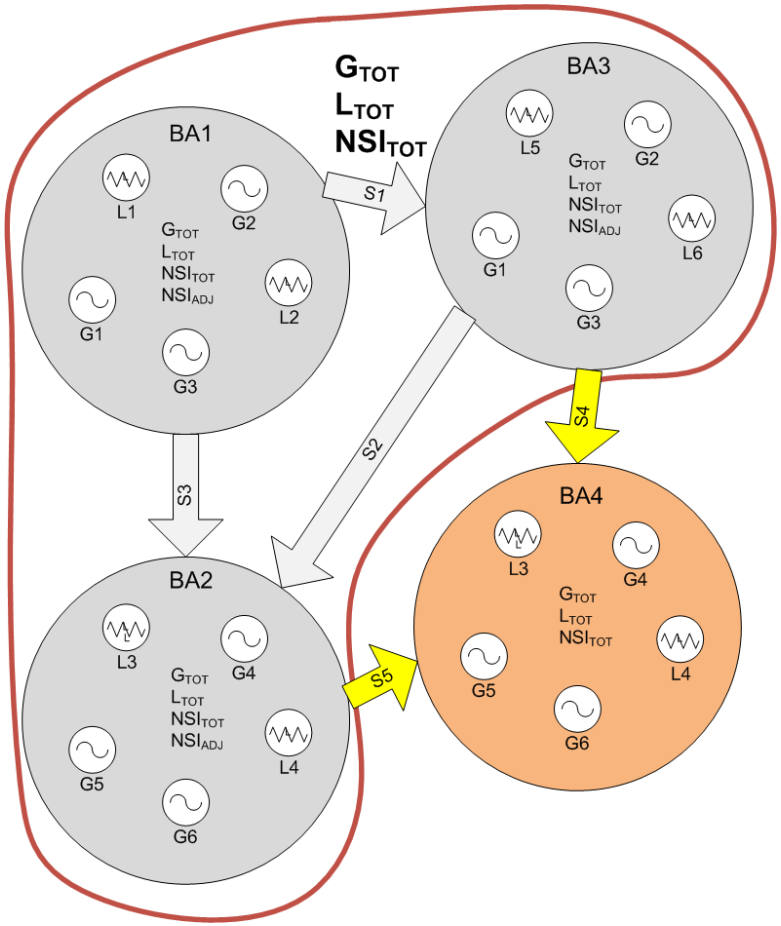
Largely for the 60-min Operating Hour



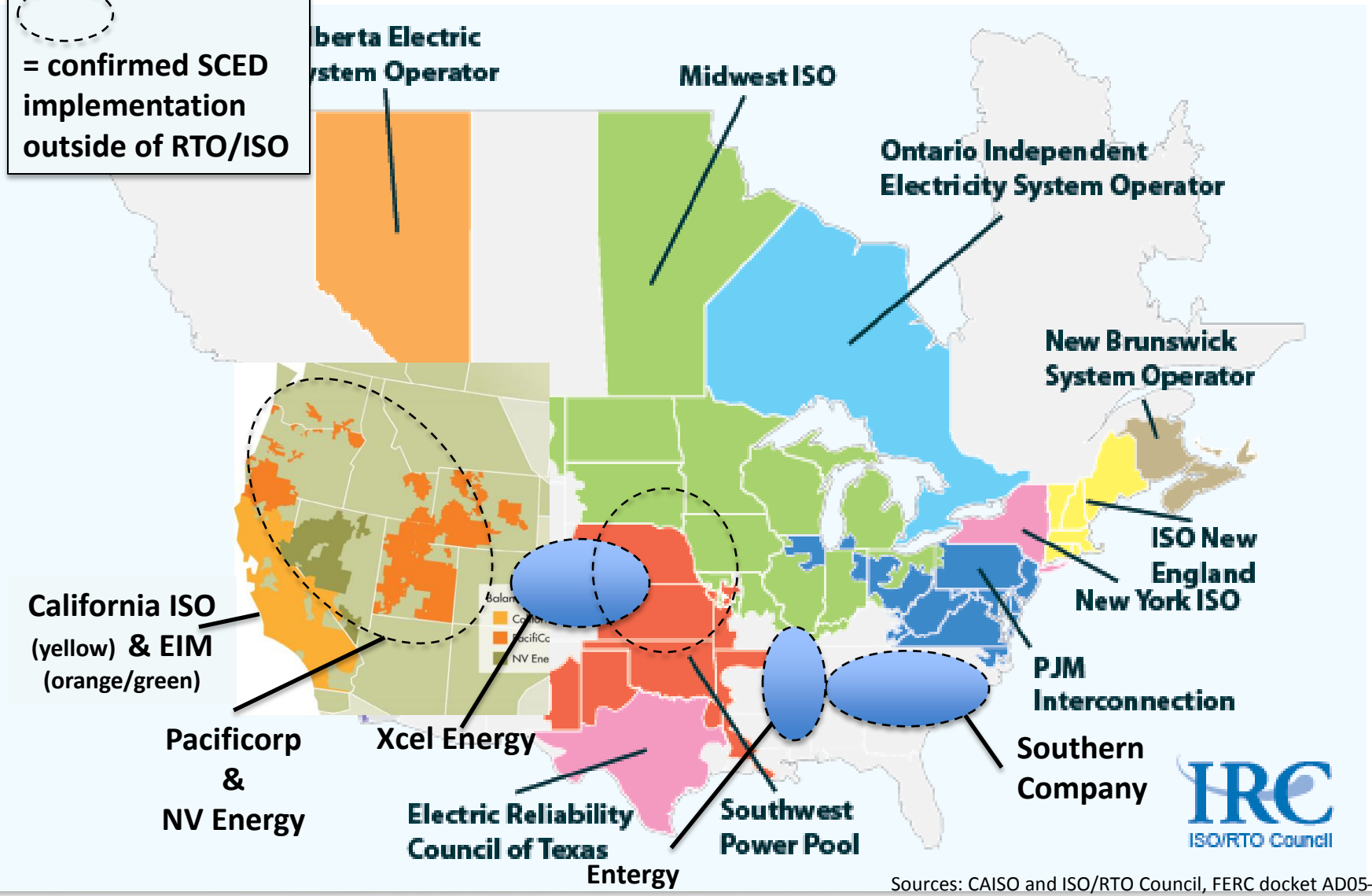
Regional SCED with Centralized Dispatch

- In a SCED, a Market Operator (MO) optimizes and dispatches resources every 5 minutes across the entire market footprint sufficient to serve the aggregated net load and obligations of the market footprint, including net market exports (S4 + S5).
- Offered resources may be dispatched off their schedule by the Market (within their dispatchable range).
- Net Scheduled Interchange for each Balancing Authority is adjusted to account for Market Dispatches.
- Physical Transmission constraints are recognized.

For Each 5-min Dispatch Interval



SCED Exists Today Across the US



Sources: CAISO and ISO/RTO Council, FERC docket AD05-13-000

Opportunities for Entities in a SCED

- LSEs could reduce their cost of meeting load:
  - Access to a broader range of resources than they have today under current scheduling practices.
  - Better understanding of deliverability risks.
  - Lower production costs.
  - Aggregated (net) the variability of generation and load imbalances over the market footprint, thereby reducing the required amount of balancing resources deployed.
- Generators retain scheduled revenues and could reduce production cost and/or increase revenue :
  - Least cost dispatch.
  - More frequent and transparent pricing.
  - Optimization of unused physical transmission capability within the operating hour.
- Reliability entities (BA, TOP, TSP) could better coordinate system operations:
  - Improvements to transmission system visibility afforded by SCED.
  - Better recognition of the diversity of forecast error and ramping needs (ie. reduced or netted) across the footprint.
  - Aggregation of the (net) the variability of generation and load imbalances over the market footprint, thereby reducing the required amount of balancing resources deployed.
  - Optimization of unused physical transmission capability within the operating hour.
  - Access to a broader range of tools and resources to help address transmission system constraints more effectively.